FORD HYBRID PROPULSION SYSTEMS DEVELOPMENT PROGRAM

DOE/MRI/FORD

Gary P. Stokes and Michael A.Tamor, Ford Motor Company

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ABSTRACT

As part of the DOE U.S. Hybrid Propulsion Systems Development program, Ford Motor Company began on December 2, 1993 a five-year program to analyze component tradeoffs for potential hybrid products; initiate design and development of fundamental enabling technologies; identify configurations and components for concept vehicle build; and build hybrid concept vehicles. The major program objective is to develop and demonstrate a production-feasible hybrid propulsion system in a vehicle that incorporates advanced propulsion, control and energy storage technologies, while meeting market requirements for cost, safety and performance. Potential deliverable vehicles include a Series Hybrid Vehicle with an Internal/External Combustion Engine, a Parallel Hybrid Vehicle with an Internal Combustion Engine, and a Low Storage Requirement (LSR) Hybrid Vehicle.

In order to move towards the production of hybrid vehicles, there will have to be considerable effort invested in the development of fundamental enabling technologies. Therefore, key enabling technologies will be evaluated in this program. In order to accomplish this goal, suppliers with enabling technologies have been invited to team with Ford. It should be noted that additional research and development of other key enabling technologies will be required for future improvements in hybrid vehicles. This additional effort is not a part of this program.

FY96 efforts included completion of the System and Component Design Phase; continuation of the development of the gas turbine and CIDI engine HPUs, two batteries and an ultracapacitor subsystem; commencement of the build of the gasoline parallel mule vehicle; and assembly of a 0.5 kWh demonstration flywheel energy storage system. FY97 efforts will include commencement of the Component Build/Test Phase; selection of the gas turbine engine HPUs and batteries to be continued in the program; build/test of the gasoline parallel mule vehicle; and commencement of the builds of the LSR and diesel mule vehicles.

This program is part of DOE's Hybrid Propulsion Systems Development Program being conducted under a cost-shared subcontract funded equally by Ford and the DOE through the Midwest Research Institute, which manages and operates DOE's National Renewable Energy Laboratory in Golden, Colorado.